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WC2**(51) INT CL<sup>4</sup>  
**E06B 3/46**(52) Domestic classification  
**E1J B**(56) Documents cited  
**None**(58) Field of search  
**E1J**(54) **Double-glazed sliding doors with included blinds**

(57) A double-glazed door installation comprises an outside door 5 and an inside door 6 each with an outer component 5a, 6a including panes 13, 29 and inner component 14, 30 including panes 18, 34 and blinds 20, in the spaces between the panes. The frame 1 has a lower element 2 provided with rails 3 and 4 supporting each assembled door on rollers 9, 27. Each outer door component carries rails 8a, 26a supporting the respective inner door components on rollers 19, 35. The outer and inner components when assembled by sliding together are secured by screws 23, 36.

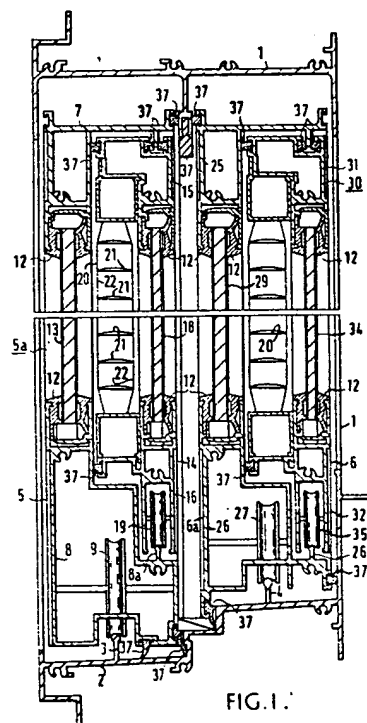
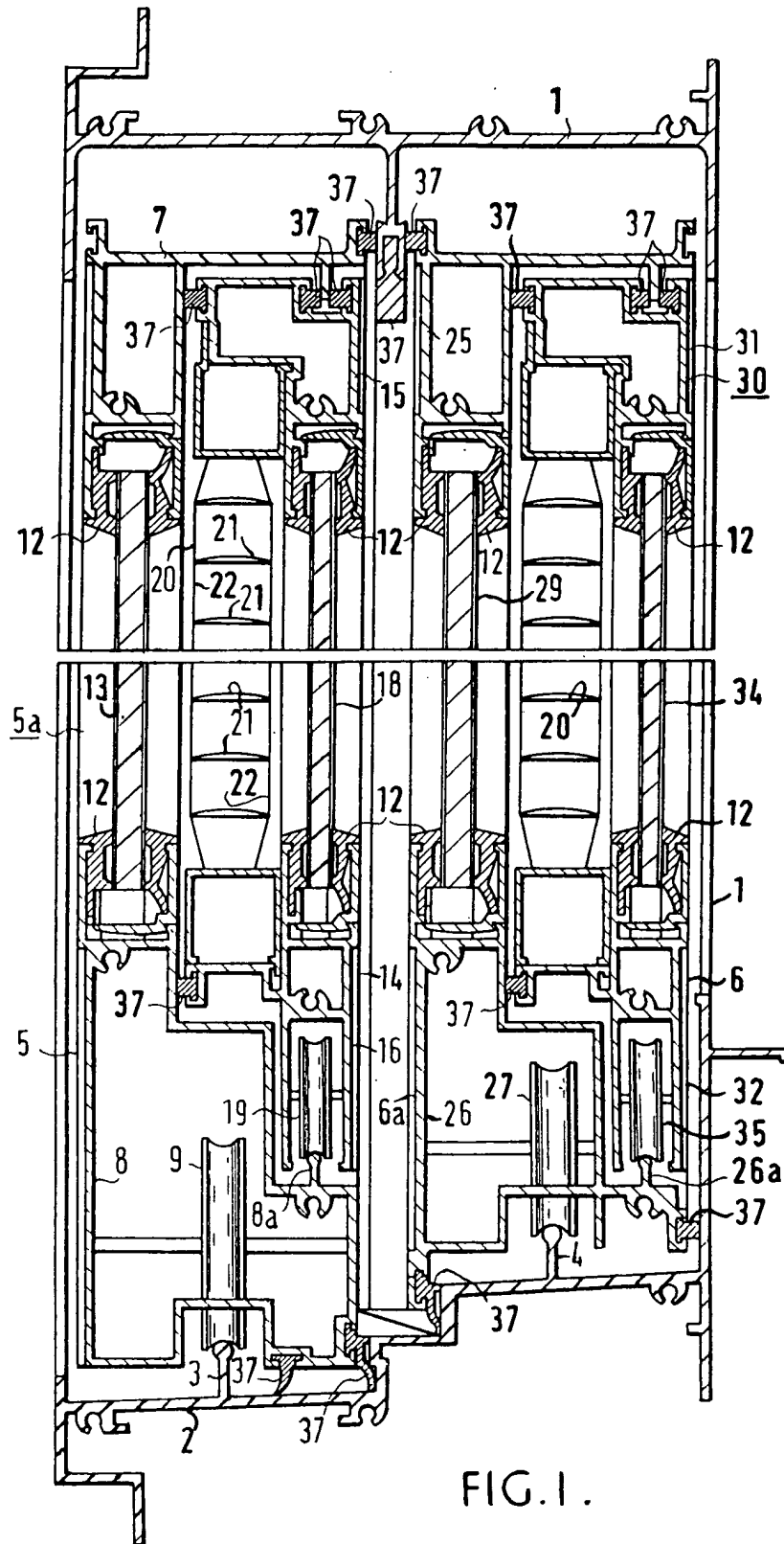


FIG. 1.

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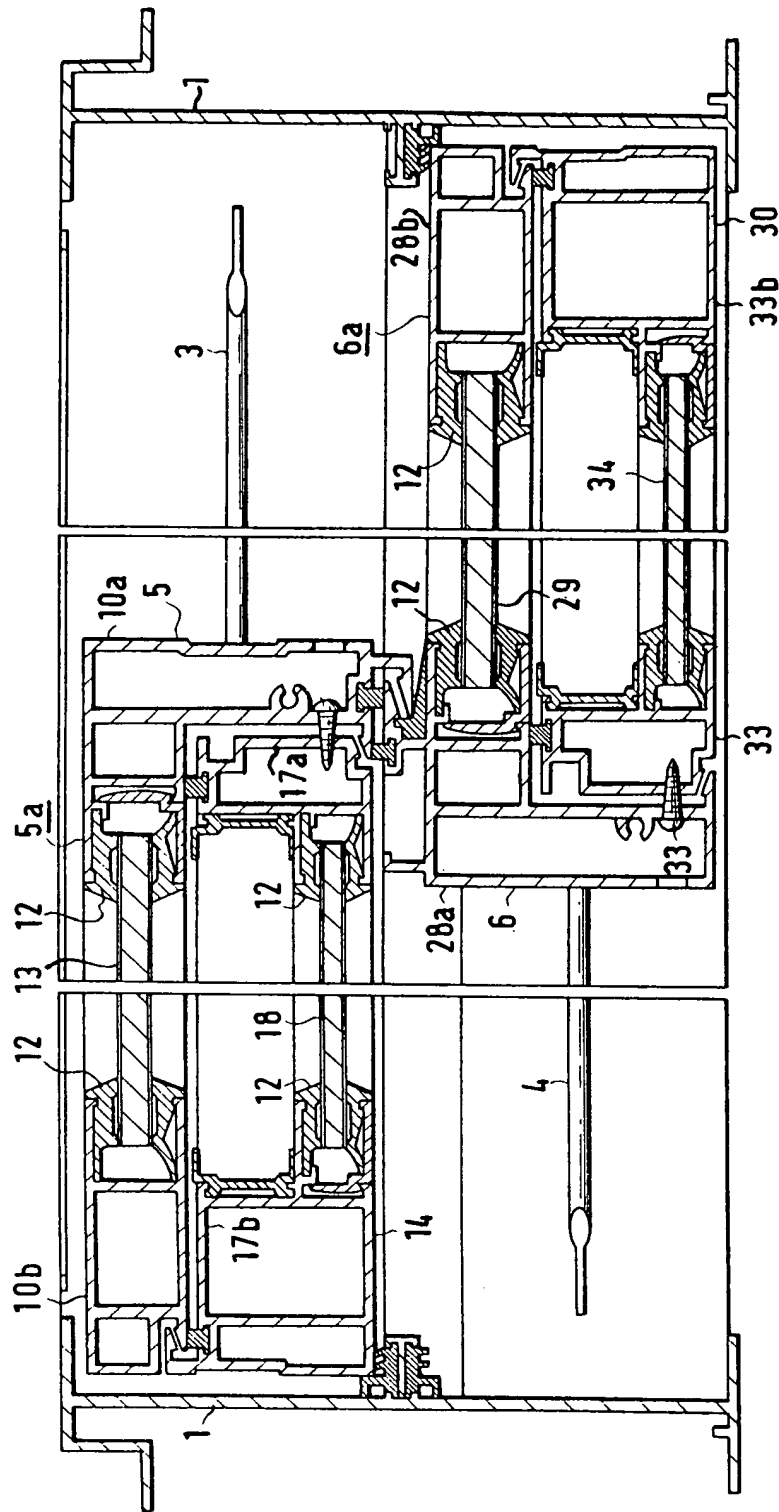
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FIG. 2.



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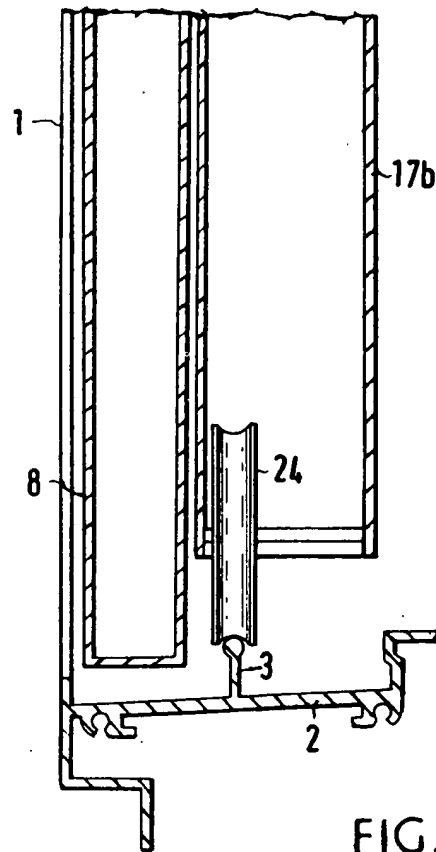


FIG. 3.

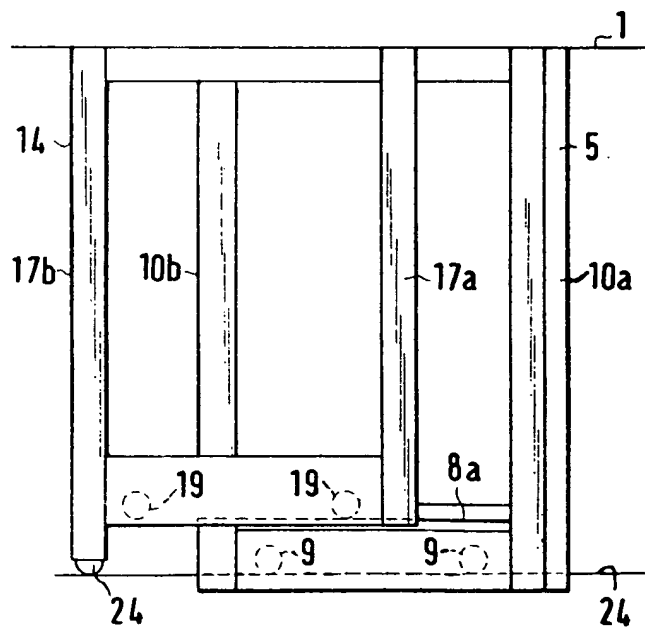


FIG. 4.

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## SPECIFICATION

**Double-glazed Sliding Doors with Included Blinds**

The present invention relates to double-glazed sliding doors with blinds incorporated therein.

- 5 Double-glazed sliding doors have heretofore been proposed either specifically as doors, or as part of a larger window structure so as to provide good sound and heat insulating properties. However, placing two glazed sliding doors in parallel

- 10 increases the width of the surrounding sash. Further, in some models to open the doors each leaf must be separately operated e.g. beginning with the operation of the inner leaf of the inside door.

- In an attempt to overcome these difficulties, 15 sliding doors as disclosed in Japanese Patent Publication 43269/1978 have been proposed. In these, there is an inside double-glazed sliding door and an outside double-glazed sliding door. The components of these respective doors are secured together with a metal fixture so that each door can be operated in the same way as a single-glazed sliding door. Such doors are supported by a single sash. Blinds with horizontal slits are mounted within each double-glazed door to act as an insulation 25 against heat and as a shield against sunlight.

- However, in order to install such known sliding doors in the common sash, the four door components must be mounted on their respective rails one by one. This is a cumbersome operation. 30 Further, the glazed components are carried and installed in the sash, after the two pairs of components are separately fixed with metal fixtures, in such a way as the total weight of the glazed outer components is imposed only on these fixtures. Hence, these fixtures are required to be 35 strong enough to hold the component parts of the two doors. As an additional disadvantage, four rails juxtaposed in the sash make it inconvenient to clean.

- 40 The present invention sets out to provide double-glazed sliding doors fitted with blinds to give heat and sound insulating properties and to be capable of shielding direct rays of the sun. It further sets out to provide such double-glazed sliding doors which 45 can be readily mounted on two rails only on the lower frame element of the sash, in the same way as conventional sliding doors.

- The invention additionally sets out to provide such double-glazed sliding doors in which when the 50 doors are mounted in the sash the weight of the interior or exterior components is not imposed on the screws that fix such components to each other.

- Moreover, in a possible feature of the invention a double-glazed sliding door is provided in which the 55 control section of an angle-adjusting mechanism, for adjusting the inclination of the slats in the blind, is more conveniently mounted than in the prior art.

- The present invention consists in a double-glazed sliding door installation comprising:

- 60 glazed outer door components each having an outer door component lower frame element  
glazed inner door components each disposed and supported on the respective lower frame element of an outer door component in such a way as to be

- 65 movable longitudinally thereof for assembly or disassembly

- blinds each mounted between an inner and an associated outer door component, and rails for separately supporting each double-glazed 70 door, as formed by an outer door component, an inner door component and included blind, on a lower frame element of a common surrounding sash, so as to be jointly movable longitudinally thereof for opening and closing the door.

- 75 The invention will be further described with reference to the accompanying drawings, in which:  
Figure 1 is a vertical section of a pair of double-glazed sliding doors according to the present invention;

- 80 Figure 2 is a transverse section of Figure 1;

- Figure 3 is a section of part of one end of Figure 1; and

- Figure 4 is a diagrammatic front elevation of Figure 1 showing how the inner and outer 85 components of a door move relative to each other.

- In the door installation as shown, a sash 1 surrounds two parallel double-glazed doors 5 and 6, door 5 for convenience only being referred to herein as the outside door and door 6 as the inside door.

- Each door comprises two door components: 90 outside door 5 has a glazed outer component 14 while inside door 6 has a glazed outer component and a glazed inner component 6a and a glazed inner component 30.

- 95 The transverse sash-frame bottom element 2 of sash 1 supports both doors. In cross-section (transverse to its own length as shown in Figure 1) it has a stepped profile, as shown.

#### A. The Outside Door

- 100 Outer component 5a of the outside door 5 has a transverse upper door-frame element 7 and a transverse lower door-frame element 8, each extending for the full thickness of outside door 5. The upper surface of lower door-frame element 8 105 has a stepped profile viewed in section transverse to its own length.

- Projecting upwards from the lowest stepped portion of bottom sash-frame element 2 is a rail 3 the upper part of which is substantially circular in cross-section. On this rail 3 rides a plurality of sash 110 rollers 9 each journaled across the lowest, widest, part of lower door-frame element 8 and protruding from the base of this lower door-frame element.

- 115 Pane of glass 13 extends between the top "step" of the upper surface of lower door-frame element 8 and the underside of upper door-frame element 7 being sealed thereto (and to the adjacent side door-frame elements 10a, 10b as shown in Figure 2) by gaskets 12.

- 120 The bottom "step" of the upper surface of the lower door-frame element 8 carries an upwardly projecting rail 8a again substantially circular in its transverse cross-section.

- 125 Inner component 14 of outside door 5 fits generally between upper door-frame element 8, and lower door frame element 8, within the door thickness defined thereby. The inner door component 14 possesses a transverse lower

component-frame element 16 and a transverse upper component-free element 15. The lower component-frame element 16 has a lowermost extension in the form of a downwardly open channel. A plurality of rollers 19 are journaled in the walls of this channel and jointly ride upon rail 8a.

Pane of glass 18 extends between the upper and lower component-frame elements 15 and 16 and side frame elements 17a, 17b (Figure 2), being sealed thereto by gaskets 12.

The space between panes 13 and 18 is also surrounded by, and part of, inner component 14 of outside door 5. It accommodates a blind 20 with slats 21 held by ladder cords 22. An angle-adjusting mechanism (not shown) for the slots is mounted in upper component-frame element 15 and a control for the blind (also not shown) is mounted in side component-frame element 17.

For initial assembly, inner components 14 of outside door 5 is slid by virtue of its rollers 19 on rail 8a into correspondence with outer component 5a. Then at least one screw 23 is used to interconnect outer component side frame element 10a to inner component side frame element, 17a, so that a double-glazed structure is secured, to ride jointly the rail 3 by virtue of rollers 9. To permit this initial assembly or occasional dismantling the (left) end portion of the lower door-frame element 8 is not as shown in the section of Figure 1. It does not possess the stepped upper surface, but possesses a simple profile as shown in Figure 3. The left vertical frame of inner door component 14 of the outside door 5 itself carries, at the bottom end, a roller, as at 24 which rides on rail 3. Thus, if the two components 5a and 14 are to be disconnected, inner component 14 rides on both rails as shown.

#### B. The Inside Door

Outer component 6a of the inside door 6 has a transverse upper door-frame element 25 and a transverse lower door-frame element 26, each extending for the full thickness of inside door 6. The upper surface of lower door-frame element 26 has a stepped profile in section transverse to its own length.

Projecting upwards from the highest stepped portion of bottom sash-frame element 2 is a rail 4, the upper part of which is substantially circular in cross-section. On rail 4 rides a plurality of sash rollers each journaled at a lower part of lower door-frame element 26 and protruding from the base of this lower door-frame element.

Pane of glass 29 extends between the top "step" 8 and the underside of upper door-frame element 25, being sealed thereto (and to the adjacent side door-frame elements 28a, 28b as shown in Figure 2) by gaskets 12.

The bottom "step" of the upper surface of the lower door-frame element 26 carries an upwardly projecting rail 26a again substantially circular in cross-section.

Inner door component 30 of inside door 6 fits generally between upper door-frame element 25 and lower door-frame element 26, within the door thickness defined thereby. The inner door

component 30 possesses lower component-frame element 32 and an upper component-frame element 31. The lower component-frame element 32 has a lowermost extension in the form of a downwardly open channel. A plurality of rollers 35 are journaled in the walls of this channel and jointly ride upon rail 26a.

Pane of glass 34 extends between the frame elements 25 and 26 and side frame elements 33a, 33b (Figure 2) being sealed thereto by gaskets 12.

The space between panes 29 and 34 is also surrounded by, and part of, inner component 30 of inside door 6. It accommodates a blind 20 with slots held by ladder cords and provided with an angle-control mechanism, and a control, as described above.

For initial assembly inner component 30 of inside door 6 is slid by virtue of its rollers 35 on rail 26a into correspondence with the outer component 6a. Then at least one screw 36 is used to interconnect outer component side-frame element 28a to inner component side-frame element 33a so that a double-glazed structure is secured, to ride jointly on rail 4 by virtue of rollers 27. To permit this initial assembly, the right-hand side portion of the lower door-frame element 26 possesses only a simple profile, and the right vertical side-frame element 33b of inner door component 30 itself carries a roller which rides on rail 4, analogously to the structure as described above in relation to the outside door 5.

To preserve good thermal and sound insulation barriers strips 37 of heat-insulating material are provided within and between the inside and outside doors e.g.: between the lower door-frame elements 8 or 26 and bottom sash-frame element 2; between the upper door-frame elements 7 or 25 and a central locating rib of the sash-frame element 1; between the outer upper door-frame elements 7 and 25 and the upper component-frame elements 15 and 31; and so on, as shown in Figure 1.

The double-glazed sliding door may be installed and operated in the following fashion. The inner door components 14 and 30 are first mounted on the rails 8a and 26a. Then, the inner door components 14 and 30 are fixed in relation to the outer door components 5a and 6a respectively, with screws 23 and 36, thus forming the double-glazed doors 5 and 6. These doors 5 and 6 are then movably mounted on the rails 3 and 4, respectively, of the sash 1.

Consequently, the double-glazed doors 5 and 6 are mounted in the sash 1 when the inner door components 14 and 30 are already fastened to the outer door component 5a and 6a, and installation is accordingly easy to perform. Furthermore, the inner door components 14 and 30 are mounted on the rails of the outer door components 5a and 6a. Hence, screws 23 and 36 are not required to have a sufficient strength to withstand the weight of the inner components 14 and 30. In addition, even if the screws 23 and 36 were omitted, the inner component 14 and the outer component 5a could be moved in unison, as a double-glazed door 5, by manually raising and operating the side frame elements 10a and 28a of the outer components 5a and 6a.

The same applies to inside door 6 and its outer component 6a and inner component 30.

In the prior art blinds are mounted within double-glazed doors, at the outer component, but the angle-adjusting mechanism for controlling the inclination of the slats is required to have its control section mounted in the vertical frame of the inner component, thus making the structure complicated and tending to cause malfunction. In contrast with this, the blinds 20 hang from the upper frame elements 15 and 31 of the inner door components 14 and 30 in this embodiment and so the control section of the angle-adjusting mechanism can be readily mounted in the vertical frame of these inner door components without disadvantage. Also, it is readily possible to shield the direct rays of the sun by controlling the inclination of the slats 21 of the blinds 20.

The double-glazed sliding door structure of the invention can be readily mounted in a sash 1 which is convenient to clean because it is provided with only two rails 3 and 4.

In a modification rails 8a and 26a at least may be omitted from the lower frame elements 8 and 26 and the rollers 19 and 35 be dimensioned for rolling on the upper surfaces of these lower frame elements. It is also possible to mount a sash roller such as at 24 on a suitable guide on an upper frame element. Panes of glass 13 and 18 in the above embodiment may be replaced with transparent plates of plastic.

Many different embodiments of this invention may be made without departing from the scope of the invention as defined in the appended claims.

#### CLAIMS

1. A double-glazed sliding door installation comprising: glazed outer door components each having an outer door component lower frame element  
glazed inner door components each disposed and supported on the respective lower frame element of an outer door component in such a way as to be movable longitudinally thereof for assembly or disassembly

blinds each mounted between an inner and an associated outer door component, and rails for separately supporting each double-glazed door, as formed by an outer door component, an inner door component and included blind, on a lower frame element of a common surrounding sash, so as to be jointly movable longitudinally thereof for opening and closing the door.

2. A double-glazed sliding door installation as claimed in claim 1 wherein the blinds are attached to, for movement with, the respective inner door components.

3. A double-glazed sliding door installation as claimed in claim 1 wherein each inner door component comprises an upper frame element, a lower frame element, left hand and right frame elements, and a pane of glass fitted within the said frame elements, with the blind hanging from the upper frame element.

4. A double-glazed sliding door installation as claimed in any one preceding claim wherein each inner door component has a plurality of rollers rotatably journaled along its lower frame element and in which each outer door component has a rail formed to protrude from and extending along the upper surface of its lower frame component so as to support the rollers and permit relative longitudinal assembly and disassembly movement of the two door components.

5. A double-glazed sliding door installation as claimed in claim 4 wherein one side frame element of each inner door component has a roller mounted on its lower end, and in which the lower frame element of the common surrounding sash itself possesses door-supporting rails formed to protrude from and extend along its upper surface whereby each side frame element lower end roller is also movable along a sash-frame lower element rail.

6. A double-glazed door installation as claimed in claim 1 and substantially as herein described with reference to, and as shown in, the accompanying drawings.

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